

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

## PCT

### WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

To:

see form PCT/ISA/220

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/US2005/003332

International filing date (day/month/year)  
28.01.2005

Priority date (day/month/year)  
02.02.2004

International Patent Classification (IPC) or both national classification and IPC  
INV. C12N15/00 A01H5/00

Applicant  
E.I. DUPONT DE NEMOURS AND COMPANY et al.

**1. This opinion contains indications relating to the following items:**

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

**2. FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

**3. For further details, see notes to Form PCT/ISA/220.**

Name and mailing address of the ISA:



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WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITYInternational application No.  
PCT/US2005/003332

AP20 Rec'd PCT/PTO 19 JUL 2006

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Box No. I Basis of the opinion

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1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:  
☒ a sequence listing  
☐ table(s) related to the sequence listing
  - b. format of material:  
☒ in written format  
☒ in computer readable form
  - c. time of filing/furnishing:  
☒ contained in the international application as filed.  
☒ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/US2005/003332

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**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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**1. Statement**

Novelty (N)	Yes: Claims	1-22
	No: Claims	
Inventive step (IS)	Yes: Claims	1-22
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-11, 13-22
	No: Claims	22

**2. Citations and explanations**

**see separate sheet**

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**Box No. VI Certain documents cited**

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**1. Certain published documents (Rules 43bis.1 and 70.10)**

and / or

**2. Non-written disclosures (Rules 43bis.1 and 70.9)**

**see form 210**

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING  
AUTHORITY (SEPARATE SHEET)

10/586823  
PCT/PTO 19 JUL 2006  
International application No.

PCT/US2005/003332

**Re Item V.**

1. Reference is made to the following documents:

- D1: SHUAI BIN ET AL: "The LATERAL ORGAN BOUNDARIES gene defines a novel, plant-specific gene family" PLANT PHYSIOLOGY (ROCKVILLE), vol. 129, no. 2, June 2002 (2002-06), pages 747-761, XP002366088 ISSN: 0032-0889
- D2: HOCHHOLDINGER FRANK ET AL: "From weeds to crops: Genetic analysis of root development in cereals." TRENDS IN PLANT SCIENCE, vol. 9, no. 1, January 2004 (2004-01), pages 42-48, XP002366089 ISSN: 1360-1385
- D3: HETZ WINFRIED ET AL: "Isolation and characterization of rtcs, a maize mutant deficient in the formation of nodal roots" PLANT JOURNAL, BLACKWELL SCIENTIFIC PUBLICATIONS, OXFORD, GB, vol. 10, no. 5, 1996, pages 845-857, XP002182550 ISSN: 0960-7412
- D4: HOCHHOLDINGER FRANK ET AL: "Genetic dissection of root formation in maize (Zea mays) reveals root-type specific developmental programmes" ANNALS OF BOTANY (LONDON), vol. 93, no. 4, April 2004 (2004-04), pages 359-368, XP002366090 ISSN: 0305-7364
- D5: DATABASE UniProt [Online] 1 March 2003 (2003-03-01), "Hypothetical protein OSJNBb0050N02.10." retrieved from EBI accession no. UNIPROT:Q8H081 Database accession no. Q8H081

The present application relates to nucleotide sequences which encode a peptide responsible for the RTCS (rootless for crown and seminal roots) phenotype and transformed plants comprising these sequences.

There is no document in the prior art disclosing the RTCS protein and the gene encoding it.

The plant mutant RTCS has been identified (see D3), a hypothetical protein which shares 58.4% of sequence identity (see D5) and the LOB sequences which were shown to be

expressed at the base of lateral organs in the shoots and roots of Arabidopsis (see D1). However, those proteins which are associated with the RTCS mutation have not been described. Therefore, the application contains patentable subject-matter.

However, the following objections should be taken into account.

The scope of protection as defined in the claims has been broadened from the specific sequence by the indication of a percentage of sequence identity ranging from 70 % to 99 % sequence identity. Generally broadening of a specific sequence without any limitation by function is inadmissible under Article 6 PCT. Therefore all product claims apart from claim 9 are objectionable under Article 6 PCT.

In as far as claim 12 is concerned, the present authority is of the opinion that the sequences of SEQ ID No. 2,3 and 4 cannot be maintained in the present application. It has nowhere been proven that these sequences are indeed promoter sequences of the RTCS protein. In fact these sequences are sequences with no function which are not considered to be industrial applicable. It goes without saying that these sequences also do not combine with the remaining subject-matter in a manner as to form a single inventive concept. An explicit objection for lack of unity, however, is not raised which does not mean that this might not occur in a later stage of the prosecution of the present application.